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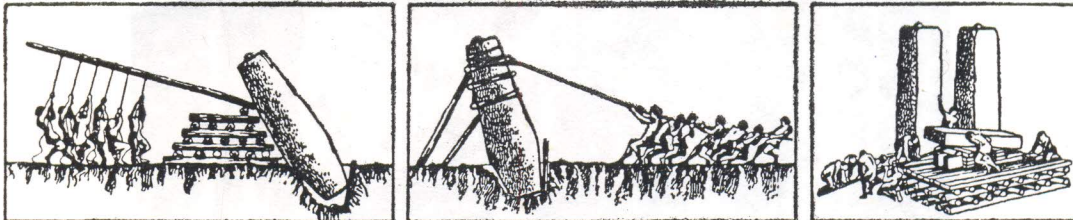


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News from the MADRAS SNAKE PARK AND
MADRAS CROCODILE BANK

One python laid eggs this year but unfortunately only ~~three~~ hatched. The sixteen 1982 hatchlings are doing well and are scheduled for release this year.

J. Vijaya and Shekar Dattatri made a herp trip to Sri Lanka, though disrupted by the tragic race riots, their trip was valuable and is reported in brief in this issue.

The Irula Cooperative is shifting its center of activities to the Madras Crocodile Bank Trust premises on October 1st. The Co-op has just received an interest free loan from WWF-India for Rs.20,000/- a welcome acknowledgement of the Co-op's importance.

At the Crocodile Bank recent big breeding news is that one female saltwater crocodile laid 42 eggs, resulting in 17 hatchlings, the first captive breeding of this species in India.

Four caiman nested, the details for these and the mugger breeding are given inside.

Twenty-seven green iguana hatchlings are being reared from two clutches which hatched in May at the Croc Bank.

Several species of turtles recently hatched at the Croc Bank including Lissemys punctata (again seemingly in response to the sound and vibration of a very heavy rain storm), Melanochelys t. trijuga and Kachuga tentoria.

And we are pleased to report that the Croc Bank has received a grant of US\$7500 toward its new turtle and tortoise captive breeding programme from the Wildlife Preservation Trust International, in the U.S.A.



A NOTE ON SNAKES IN THE GHAT FORESTS OF THE NORTHWEST ANAIMALAI IS, KERALA STATE

Introduction

The following observations were made in the course of a short field project (Groombridge et al, 1983; Vijaya, 1983) carried out in late October 1982, within a few kilometres of Kavalai, in the northwest fringes of the Anaimalai Hills, Kerala State, southwest India.

This area supports a complex mosaic of evergreen rainforest, semi-evergreen rainforest and monsoon forest. In 1907 a meter gauge forest tramway was constructed to allow exploitation of timber resources in the Parambikulam range. This tramway ran through Kavalai from the Parambikulam area about 32 km to the east, and on to the railway station at Chalakudi, about 32 km to the west. It was found to be uneconomical and was removed around 1960. Not surprisingly, some areas around Kavalai itself appear to have been logged in the past, but much of the forest we visited was separated from the former tramway course by steep mountain ridges, and appeared to be undisturbed semievergreen and evergreen rainforest.

The primary purpose of this project was to collect data on the terrestrial chelonians of the area; this involved systematic searching of the forest floor at the study sites, the snake observations were made incidental to this activity. No special effort was made to discover snakes and it is certain that many other snake species occur in the area. Despite these limitations, these simple observations are presented as a prelude to further, more detailed, work planned on the herpetofauna of the area.

Observations

October 29. Walked about 6 km into the forested hills southeast of a settlement of Kadar tribals, initially on a quite well-defined trail, later through trackless undergrowth and forest. During approximately six hours walking six snakes were observed, five being Hump-nosed Pit-Vipers Hypnale (= Aekistrodon) hypnale (Gloyd, 1977), a species restricted to southwest India and Sri Lanka. All H. hypnale were found on the forest floor. The first was dark grey in ground colour with darker crescentic markings dorsally, exactly matching the rocks of the track on which it was found. Three of the remaining four specimens were medium grey-brown in ground colour, one was pale grey-yellow. Three of these snakes were seen under vegetation along the trail, one was found away from the trail on a steep slope with cane clumps and rocky outcrops. The sixth specimen was a uropeltid (Rhinophis sanguineus (endemic to southwest India), found on the track, apparently immobile and partly exposed to full sunlight, at about 500 m altitude.

There had been heavy rainfall the previous day. This snake closely matched the description of the species provided by Smith (1943), with the exception that the ground colour of the ventral surface was a pale 'dirty' yellowish buff, with chestnut-red colouration restricted to the underside of the tail.

October 30. Walked for about two hours, up and down two steep forested ridges, to a site northeast of the Kadar settlement. Returned by the same route. Eight snakes were seen during a total field time of about seven and one quarter hours. Three of these, including two specimens of Ahaetulla nasuta, or Vine Snake, were encountered on the walk to the main site, where the remaining snakes (all pit-vipers) were seen. The first A. nasuta was first seen near the base of a very large tree near the crest of one ridge, where it may have been at rest; upon being disturbed it moved rapidly down the steep slope, with rockfalls and dense ground cover of shrubs between large trees. The second specimen of this species was seen amid green grass on a sloping path through dense, partly exposed to the sun in places. One H. hypnale was found under the vegetation by the edge of a rocky path ascending the rocky hillside. At the main site a second H. hypnale was seen, tightly coiled on leaf litter on the forest floor. Here also a medium length Malabar Pit-Viper Trimeresurus malabaricus, a species endemic to southwest India, was seen loosely coiled on a boulder about one meter in diameter projecting above a rocky and precipitous mountain stream. About 25 m away from this snake a large T. malabaricus was found. Its markedly prehensile tail was curled around a low seedling, about 50 cm from the ground, while the trunk curled loosely downward around the sapling, with the head nearly at ground level. The ground cover here was relatively sparse, the forest floor being covered in a thin layer of leaf litter interrupted by occasional rock outcrops. Third and fourth specimens of T. malabaricus, both small (about 25 cm), were seen on a nearby slope of opposing aspect. Both were loosely coiled at around chest height on the upper branches of saplings.

October 31. Same site as previous day. During approximately seven and three-quarter hours in the field, including three and one half at the main study site, only two snakes were seen. One H. hypnale was first seen backing away from the author's foot as it was nearly trodden upon. Apparently it had been coiled up on the forest floor. The medium strength grey-brown dorsal colouration, with darker rather crescentic markings, made the snake virtually invisible (to the human observer) against the leaf litter. The fallen leaves were all pale to medium grey-brown, with prominent darker veins. One large T. malabaricus was seen resting more or less horizontally on a piece of fallen bark, with the tail curled around one end, and the body partly exposed to patches of sunlight filtering through the leaf canopy.

Regarding T. malabaricus, it is of interest to note the different microhabitats in which individuals of different size/age classes, broadly categorized as 'small', 'medium' and 'large' (65-80 cm), were observed. Both small specimens seen were on the peripheral branchlets of chest-high saplings, not in close proximity to water. These were predominantly medium grey-brown in colour. The two large specimens were seen close to the forest floor,

in both cases with the prehensile tail tightly curled around a branch (or fallen bark) and the head nearly at ground level. Both were 'green phase', the leaf green trunk colour contrasting with yellow-edged dark geometric dorsal markings, and mainly black dorsal head scales. The medium size specimen was seen at a stream edge, this was a green-phase individual, but with the pattern not as bright as the two large specimens. A further eight specimens found at another site in the Nilambur Valley of Kerala (Dattatri, 1983) were all medium size and all observed along a stream edge, sometimes on plant stems overhanging the rapidly flowing water. These preliminary observations, although based on a very small sample size, suggest that there may be marked differences in microhabitat preference, and thus perhaps in preferred prey, between the different size/age classes. Possibly the young feed on small arboreal invertebrates or vertebrates, the medium size class on aquatic frogs, and the large specimens on larger terrestrial or arboreal vertebrates. However, no food records were made and no feeding behaviour was observed. There may be a clear distinction between microhabitats utilized for foraging and those in which the vipers were seen; on the other hand, most vipers are 'sit and wait' and the locations at which they are seen during the day may be the same kind of locations at which prey is taken.

Remarks based on conversation with Kadar tribals

Four species of Pit-viper are known to occur in the southern parts of the Western Ghats (Whitaker, 1978; Smith, 1949); one informant reported that three different kinds occur in forests around the Kadar settlement, but the Kadar themselves appear to group all pit-vipers together in one category, under the name Nethulechetti. The Kadar speak a mixture of Malayalam and Tamil, with certain modifications. Ahaetulla nasuta is called Pachevele Pambu or 'Green Leaf Snake'. Pambu is the general Tamil name for snakes. Uropeltids, said to be typically observed when digging sweet potatoes near the village, are termed Kurudi Pambu or 'Blind Snake', a category that also includes scolecophidian snakes (worm snakes). The Indian Python Python molurus is not often seen, it is called Perum Pambu or 'Fat Snake'.

The Common Cobra Naja naja is known as Sarpam; the King Cobra Ophiophagus hannah as Karuvelan or 'Black Spear'. King Cobras are reportedly seen most frequently in the drier times of year (February-April in this area), when snakes have apparently been seen drinking and nest building (the author hopes to be able to confirm these reports in the future). There appears to be no account of the nesting behaviour of King Cobra in the Indian peninsula, although the existence of a nest was reported near Castle Rock, in the northern parts of the Western Ghats (Wasey, 1992). Some observations on a King Cobra nest in the Andamans have recently been published (Whitaker and Whitaker, 1982).

The local Kadars knew of no fatalities due to Pit-Viper or Cobra envenomation, although bites do occur. Reportedly, the area subjected to Pit-Viper bite swells up for about four days. We were told that most people keep a supply of herbal medicine, composed of a mixture of bark, leaves, fruit and seeds, that is believed to be effective in countering the effects of envenomation. The medicine is placed on the bitten area, and also eaten, for a period of about three days.

Acknowledgements

The author is extremely grateful to the Kerala Forest Department, for facilitating fieldwork; to the People's Trust for Endangered Species, for providing funding for the main project; and to Ms.J.Vijaya (Research Officer, Madras Crocodile Bank), for translation and other assistance.

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A RECORD ANTIDOTE?

W. Wilson Mayne recalls a strange treatment for snake bite
New Scientist 23 June 1983

Snakes were common enough in the forests and coffee plantations in North Western Mysore (now Karnataka) where I lived in the 1930's, some of them were lethally venomous. Snake bites however, were rare and I can only remember one fatality in the 14 years I lived there. However, one day my cook loudly proclaimed that he had been bitten by a snake. His alarm was equalled only by my scepticism.

By the time I reached him, the snake had gone, but the evidence of two punctures on his ankle was ample proof of his misadventure. He was in a fine state of panic and had jumped to the conclusion that his assailant was undoubtedly lethal and that his last hour was not far off. I did my best to reassure him, though I thought it advisable to assume the worst and act accordingly. He then accepted first aid was to scarify the wound with a sharp razor blade, suck out as much venom as possible and rub in a universal disinfectant potassium permanganet.

The cook now thoroughly demoralised, resisted this treatment, so I sought reinforcements. Fortunately several people with much wider experience than I had in emergency matters worked just down the hill at the coffee experimental farm. I quickly sought their advice and assistance. In the ensuing conference I was confidently informed that powdered gramophone record applied to the wound was an efficacious remedy. The victim considered this preferable to the more orthodox treatment outlines in the Planter's first aid handbook. We adopted the measure: fortunately there was no shortage of old gramophone records in our small community.

Apart from a very sore ankle that persisted for a couple of days, the cook suffered no ill effects and recovered completely. The experience no doubt confirmed some of the participants in their opinion that the treatment worked. I was more inclined to the belief that the snake was not venomous and that the gramophone record had really been superfluous.

After the incident and a few subsequent days of concern, the whole affair disappeared into the back of my mind for forty years. It was sharply resuscitated though when I read a book that I had selected from a ship's library during a particularly rough voyage to Australia at the end of 1980. It was *Mulu: the Rain Forest*, by Robin Hanbury-Tension, and it included an account of a very similar incident in the interior of Sarawak. The remedy that he referred to consisted of powdered 78 rpm gramophone record, "well known local cure for snake bite, probably because it has a caustic effect and burns off the surrounding skin and flesh". This anecdote did little in my mind to validate the treatment even though the snake had proved to be venomous and the victim's symptoms had been alarming. The prompt application of modern first aid and the rapid transfer of the patient to a hospital produced a satisfactory recovery.

But the curiosity remains: how could such a bizarre nostrum gain currency in two remote places, several thousand miles apart in space and 40 years apart in time? To the best of my knowledge, none of my "advisors" had ever ventured outside of Mysore State and it seems unlikely that the local "practitioners" in Sarawak would have been any more widely travelled.

Preoccupation with the problems of settling in a new country stopped me from making any further inquiries. In August 1981, however, a request appeared in the Sydney Morning Post for information on early Australian snake showmen and antidote sellers. My interest was revived. I wrote to the inquirer who replied that although he had practically completed his researches, he had never come across the use of powdered gramophone records.

And so the problem remains. Who could have thought up such an old antidote and how did the information get around?.

AN INTERESTING SNAKEBITE CASE REPORT

Hospital	- Raidighi Rural Hospital
Patient's Name	- Debendra Nath Das,
Age	- 49 years
Sex	- male
Address	- Village- Purbasripatinagar P.S. Patharpratima District 24 Parganas
Date and time of bite	- 6/7/83 at bout 10 A.M.
Date and time of examination	- 7/7/83 at 8A.M.
Alleged Snake	- Vine snake (<u>Ahaetulla nasuta</u>) Local name - Landaga

History: On 6/7/83 morning while he was cutting a tree deep in the Sunderbans he was bitten by a green vine snake on his head at about 10A.M. He saw and identified the snake, but failed to kill it. He felt burning pain and within about 2 hours a swelling developed around the bitten marks. Then he along with his associates rushed to this hospital and reached here next morning at 8 A.M. It may be noted that the above Reserve Forest is about 50/60 km. away from this hospital by river.

The patient's chief complaints were difficulty in swallowing even liquids, difficulty to speak properly and also difficulty in protruding the tongue due to pain.

On examination: Severe swelling and pitting oedema of the whole scalp, forehead, upper and lower eyelids, nose, lips ears and whole neck (i.e. head, neck and face). His neck looked like a bull's neck. Swelling and oedema spread upto the both supraclavicular regions and front of the upper part of the chest. Severe tenderness of the above noted areas along with the acute enlargement of the lymph nodes. The patient could not open the eyes at all due to heavy oedema of the eyelids which looked very shiny. No conjunctival or corneal congestion was observed. No congestion of the nasal mucous membrane, but the pharynx was very congested. Patient developed no general symptoms like malaise, fever, vomiting etc.

Management: 1. Full assurance was given to the patient and his relatives as regards good prognosis.

2. Injected Avil I.M Stat and twice daily for 3 days.

3. Injected Decadron 1 cc. (4 mgm.) I.M. stat and twice daily for 3 days.

4. Injected Ampicilline 500 mgm. I.M. stat and 500 mgm. I.M. every 8 hours for 24 hrs. ('stat' means at once)

5. Lasix 1 tablet stat and 1 tablet twice daily for 3 days.

6. Plenty of fluid by mouth including electral & glucose powder.

After about 4 hrs. swelling moderately subsided and the patient could see and protrude his tongue easily. Then, swelling, oedema and pain gradually decreased. 24 hours after treatment the patient felt more comfort, but swelling, oedema and tenderness of the above mentioned areas still persisted. Then, Ampicilline capsules (500 mgm.) were given by mouth every 8 hours for 4 days more. After 3 days Avil tablets and prednisone tablets were given by mouth for 4 days.

The patient was completely cured and was discharged on 13/7/83.

Remarks: According to several authors (K. G. Charpurey. 1935; P.J. Deoras, 1965 and Romulus Whitaker, 1978) the venom of the green vine snake is mildly toxic and its bite may cause little pain and swelling. In this treated case the patient developed no systemic symptoms of poisoning but he developed severe local signs.

Dr. S.G. Saha, Medical Officer
Raidighi Rural Hospital
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Editorial Remarks: The "laudaga" referred to by the wood cutter was undoubtedly a pit viper, perhaps Trimeresurus erythrurus (spot-tailed pit viper), a green species that could be easily confused with the harmless vine snake especially under the extreme circumstance of being bitten. A pit viper bite in the face was described to me in the Andamans and sounded very much like Dr. Saha's case. The details of the medical management of the bite are valuable.

DIVERSITY IN THE DISTRIBUTION OF SOME SNAKES IN THE SUNDERBANS
(INDIAN SIDE)

Tom Whitaker writes The word 'Sunderbans' has long evoked visions of the vast dark mangrove forests and all the mysteries of such a rich, dynamic habitat. I have lived in the Sunderbans for 16 years.

Sunderbans possesses a diverse snake fauna, about 25 species and sub-species of snakes are present in this area.

The Sunderbans is about 60% land area and 40% water. The lower part of the Sunderbans (Bay of Bengal side) has many islands, whereas the rest is mainly a continuous land mass. The ecology is similar in these two parts though the lower part is more jungly and the area of wet lands and ponds, canals, creeks etc. is greater than the upper side. The lower side is also richer in mangrove vegetation which is the main portion of the Reserve Forest. The diversity of distribution of some species of snakes has been observed in these two divisions (upper and lower) of the Sunderbans:

Name of snake	The Sunderbans (Indian side)	
	Lower part	Upper part
1. Cat snake (<u>B. trigonata</u>)	R	C
2. Monocled cobra (<u>N.n. Kaouthia</u>)	C	I
3. Spectacled cobra (<u>N. n. naja</u>)	R	C
4. Russells viper (<u>Vipera russelli</u>)	R ¹	I
5. Banded krait (<u>B. fasciatus</u>)	N ²	I
6. Common krait (<u>B. caeruleus</u>)	C	I
7. Brouzeback tree snake (<u>D. tristis</u>)	I	R

Key: R- Rare, C-Common, I-Intermediate, N-Nil

1. My father Dr. S.G. Saha was a medical officer incharge of a Health Centre in the lower Sunderbans for about 17 years and he treated about 600 snake bite cases. There was no Russell's viper bite in his record (see Hamadryad Vol.8 No.1, Jan. 1983).

2. Not a single banded krait was reported in the lower sunderbans for 17 years (see Hamadryad, Vol.7 No.2, May, 1982).

N.B. Pythons and king cobras are not included in this list, because they are not found in these localities.

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SNAKE SIZES AND LOCALITY DATA:

Rajendran Vyas gives the following recent records from Bhavnagar:

Locality record: Dumeril's black-headed snake,
Sibynophis subpunctatus (2 specimen)

Size records : Saw-scaled viper, Echis carinatus (female)
91.5cm (In India the maximum size known was about 80cm).
Banded racer, argyrogona fasciolatus (female) with 23 eggs)- 180 cm (Wall, in Smith 1943 gives 126cm as the maximum known length of this species).

Correspondence on the distribution, sizes and breeding periods of Indian snakes is invited by the Editor.

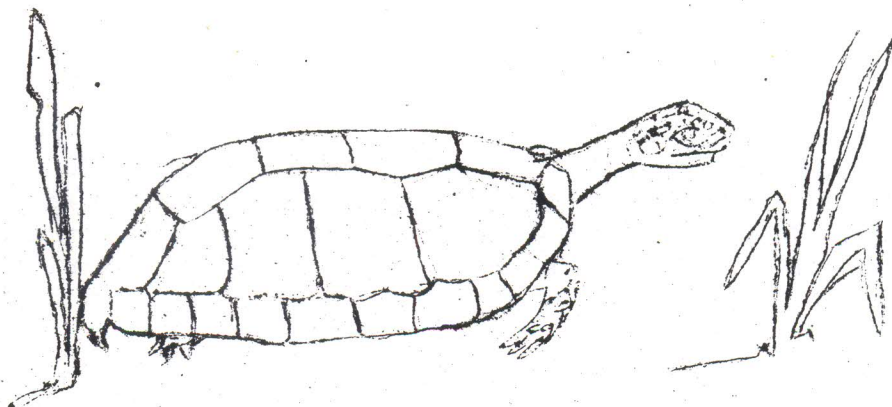
PYTHON EATS MANGO

(From the 'Anjkal', 15.6.83)

'Resma'- a 2.4 meter long python, prefers to eat mango. Recently "Friends of the Animal Society" handed over this python to Pesowar Park Zoo.

One year ago, the members of this society collected this python from near the historical "Singad Fort". At that time a wound was near its belly. The python becomes cured by herbal drugs. According to the President of this society, 'Resma' eats chicken, pigeon etc. but mango is its favourite food.

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THE TRAVANCORE TORTOISE, *Geochelone travancorica*

This is the first in a series of notes which will eventually describe all of India's turtles and tortoises combining standard references and our latest findings.

One of the four tortoises found in India, the Travancore tortoise, *Geochelone travancorica* ranges along the western ghats in semi evergreen and evergreen forests at altitudes of 300m nad above within Kerala State.

Relatively common within its range, it is relished for its flesh by tribals who also sell them at small town markets. It is also a much favoured pet in many tribal homes where the tortoises are tied to pillars by boring a hole into the marginals.

The travancore tortoise is brown overall with black blotches on the carapace scutes; there a black blotch on each of the abdominal scutes on the plastron. The nuchal shield is usually absent.

This tortoise is thought to be closely related to the yellow tortoise *Geochelone elongata* which ranges in north India in Orissa, Madhya Pradesh, Uttar Pradesh, Bengal to Burma, Malaya and Thailand inhabiting dry deciduous and semi evergreen forests.

Geochelone elongata however differs from *Geochelone travancorica* in having its interhumeral seam longer than inter-pectoral seam, presence of nuchal shield and the presence of a elongated body form. The shell of a mature *Geochelone elongata* is much lighter being colored almost yellow.

Recently a Travancore tortoise carapace measuring 309mm was collected from tribals in the Chalakudy forests, Kerala by the MSPT which seems to be the longest recorded carapace length for this species (Vijaya, 1982).

They have marked sexually dimorphic characters as in most terrestrial chelonians. Males have a depressed carapace and a concave plastron. The anal notch diverges from the femoro-anal suture giving the tail a better access to curve down to reach the female during copulation. Tail is thick and elongated with a pointed tip; cloaca is placed closer to the tail end. The gular scutes are modified in the front with rounded edges.

The females have a deeper carapace with the dome being more pronounced. The plastron is flat without convexity. The tail in the female is short and blunt tipped. The pygal is not curved down as in the male but shorter and straighter enabling the tail of the male to curve under it during copulation. In the forests the tortoises are found in different habitats, at altitudes of over 300m. They have been found in thick reed bamboo groves, frequented by elephants on steep hill sides; in the cool wet forests of the much higher altitudes and from grassy knolls.

Generally these tortoises are active in the mornings and cool evenings when they feed. In the rainy season they are more active, cropping away the edible mushrooms and tender bamboo shoots sprouting from the ground. The tortoises also feed on fallen fruits like wild jack fruits Artocarpus heterophyllus, Dillenia pentagyna, jungle pears and fallen flowers.

At noon time Travancore tortoises have been seen basking in shafts of sunlight in protected areas in the forests. They are often easy to find in thick beds of fallen debris because of their characteristic manner of tunneling their way through the debris leaving a more or less circular track of open ground behind until they get fully buried under the heap. The tribals often find them by these tracks.

Auffenberg (1964) observed the breeding color changes in this tortoise when the males attain a pink coloration around the nostrils and eyes.

Courting was observed in captivity at the Snake Park. A male was introduced into an enclosure with 2 females. Initially unreactive, he soon began to take interest in both of them. The male would follow a female around the enclosure, often ramming her with his shell and sniffing in the cloacal region. The ramming is done in a spurt of action using the front of the plastron in 3 or 4 successive hits on the shell of the female. Between two such ramming bouts the male would extend its head fully, moving it with a characteristic nod while prodding its snout at any exposed soft part of the female such as the leg, tail or head.

The ramming behaviour has also been noticed among females which knock at walls and obstacles in their way while moving. It is assumed that they probably do this to dislodge rocks either to get access under, to move freely or in feeding. During mating the flared edge along the marginals on the posterior part seem to help a mounting male which firmly plants its hind legs on these edges. Neck is fully stretched and curved down, mouth is open and males emit a harsh throat clearing sound (the sound resembles this closest, but is less loud) with gaps of 20 seconds. The only vocal display by the female was a hissing sound as she tried to dislodge the male.

A single egg measuring 54mm in length, 40.5mm in width and 58.5g in weight was laid in the open on 4th March 1983. This proved to be infertile. Measurements of hatchling Geochelone travancorica are not available in literature. A juvenile, presumably a hatchling, Travancore tortoise found on 31st December 1982 in the Chalakudy forest measured as follows:

Carapace length	- 60 mm
Carapace width	- 54 mm
Plastron length	- 52 mm
Shell height	- 28 mm
Weight	- 37 gms.

In captivity these tortoises accept a vegetable and fruit diet and will also feed on pieces of beef.

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OBSERVATIONS ON THE NESTING BEHAVIOUR OF THE GANGES ROOFED TURTLE Kachuga dhongoka IN THE NATIONAL CHAMBAL SANCTUARY, UTTAR PRADESH

While monitoring nesting female gharial (Cavialis gangeticus) I had the opportunity of watching a female Kachuga dhongoka nesting 2 metres away. She was in the act of digging the nest cavity using her forelimbs. At intervals the female would insert her head in the nest cavity, straightening her hind legs to reach deeper into the cavity. The entire nest digging was done mainly by the forelimbs.

Egg laying: After nest digging was completed the female paused and seemed to survey her surroundings. She then turned and positioned her cloaca over the nest cavity. At intervals during egg laying she inserted her hindlegs into the nest cavity possibly to push the eggs deeper into the nest. The female then pushed sand into the nest with her hind legs until the nest was completely covered. It took the turtle about 23 minutes to deposit the eggs. 'Sal' - (Kachuga kachuga) nests were also seen on the same beach. I collected 2 K. kachuga and 3 K. dhongoka nests to hatch them in controlled conditions. The eggs of Kachuga kachuga are larger than dhongoka eggs and the distance of the nest from water is greater in Kachuga kachuga compared to the 'dhona', K. dhongoka nest temperatures recorded on 2 occasions in Mid May were 32°C in the morning; the same as Cavialis gangeticus and Crocodylus palustris nests in the area.

S.B. Mishra, Field Assistant
 National Chambal Sanctuary
 P.O. Udi, Etawah, U.P.

Mr. Mishra who is with the
 Uttar Pradesh Forest Dept.
 is interested in the breeding
 biology of turtles.

To:

The Editor
Hamadryad
Madras Snake Park Trust

Madam,

In "Turtle Survey Update" (Hamadryad, May, 1983) the different nesting areas along the eastern coast of India of the Pacific Ridley L. olivacea are mentioned. I wish to add that eggs of Lepidochelys olivacea have been collected from the Sunderbans coast under 24 Parganas Division during March 1983. They were hatched in rookeries at Bhagabatpur Crocodile Project, 24 Parganas Forest Division. Hatching took place in May 1983 after 65 days. All were released at the original nesting site excepting 15 hatchlings which have been kept to be captive reared to study biometrics and feeding behaviour. This is for your kind information.

Thanking you.

Yours faithfully,

Sd/-

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TURTLE SURVEY IN SOUTHERN SRI LANKA

During late July and in August we were on a visit to the island of Sri Lanka.

Previously Ron and Zai Whitaker visited here on a mugger survey (Whitaker and Whitaker 1977) and later S. Dattatri conducted a sea turtle survey along the island's coastline (Dattatri, 1982).

In the present herpetological survey we accompanied Mr. Childers Jayawardene, assistant director of Wildlife in charge and Yala National Park, which is on the south eastern corner of the island. The area surveyed was in Yala Block I, where we covered some 13 plus km of beach to count the number of predated sea turtle nests in the past one month between late June and early August.

Name of beach at Yala Block I	Length of beach	* No. of predated nests	
		L .	S.
1. Mahaseelava	2 km	17	19
2. Debragasvala	--	9	10
3. Buttawa	3 km	4	-
4. Pattanangala	3 km	15	3
5. Gonallabba	2 1/2 km	9	3
6. Uraniya	3 km	11	5
13 plus km		65	45

* 'L' is for nests with large eggs of Dermochelys coriacea and 'S' is for smaller eggs of Chelonia mydas.

approximate diameter of the large eggs ('L') (shells filled with sand) measured (1) 51 mm X 43 mm (2) 52 mm X 45 mm (3) 46 mm and the smaller eggs measured (1) 40 mm and (2) 34 mm in diameter.

According to Mr. Jayawardene, leatherbacks (Dermochelys coriacea) Greens (Chelonia mydas) and possibly hawksbills (Eretmochelys imbricata) nest during this period (May/August). Riddleys nest at Yala in November-February months, according to Mr. Jayawardene there was a case of a loggerhead (Caretta caretta) nesting at Yala in December of 1982.

Wild boar (Sus scrofa) and to a lesser extent (Canis aureus) are the main predators of sea turtle nests. Tracks showed that a single boar walking the beach in the early mornings forges nearly all the turtle nests laid on the previous night. Common monitor (Varanus bengalensis) tracks were seen on the beach on two occasions though not near the nesting area.

Earlier, on the 19th July on a walk along the beach at Kosgoda some 68 kms south of Colombo, we saw a green turtle ascend the beach twice only to return without nesting. The Kosgoda beach is about 1 1/2 km long and has been marked for use by the expanding tourist hotel industry. Many private guest houses and motels already dot the coast. Innumerable lights are kept on throughout the night which no doubt already interfere with turtle breeding. Later, on the night of 24th July we found track of a leatherback (Dermochelys coriacea) which must have nested a little before we arrived there.

Tortoises and freshwater turtles:-

Star tortoises (Geochelone elegans) are very common at Yala Park, which seems an ideal place for the study of these reptiles. Three mature tortoises (1:2) and a juvenile were seen during a five day stay there. They were collected on the way side while touring the park daily by vehicle. Once a mature male G. elegans shell was found.

The humps on the different scutes of the shell normally characteristic of Sri Lankan and Rameswaram (Smith, 1931) Geochelone elegans was not very evident in the Yala specimens. In specimens from Wilpattu park on the northwestern corner of the island, specimens at the Colombo Zoo and from a collection of 19 shells seized by the wildlife authorities at a shop in Colombo (said to have been collected at negombo 20 kms south of Colombo few shells with humps on them seen. Both males and females seem to have humped shells but it is more prominent in males.

Star tortoises are locally called as 'chhara' or 'mevara' 'ibba' referring to the high domed shell which is associated with the buddhist stupas. On the western coast between negombo and Matara where the tortoises can be obtained in sackfuls they are called 'vetakay' (pandanus) 'ibba', 'Ibba, which is literally 'tortoise' or 'turtle', also means padlock.

It is generally believed that the star tortoise is highly poisonous. This might be one of the reasons why they are still common in Sri Lanka. However, the tourist trade takes a large toll because the shells are sold as curios in Colombo. Recently the wildlife authorities seized a collection of 19 shells of various sizes from 43 mm to 195 mm carapace length. A 76 mm shell was valued at 15 Sri Lankan rupees and a 155 mm one at SL Rs 40.

Melanochelys trijuga thermalis, the Sri Lanka pond terrapin is reportedly common over most of the island. One turtle was found on the sea coast at Kosgoda. Melanochelys trijuga parkeri, the other subspecies reported from Sri Lanka was not seen in the wild. Deraniyagala (1939) records them from the north west and north central provinces.

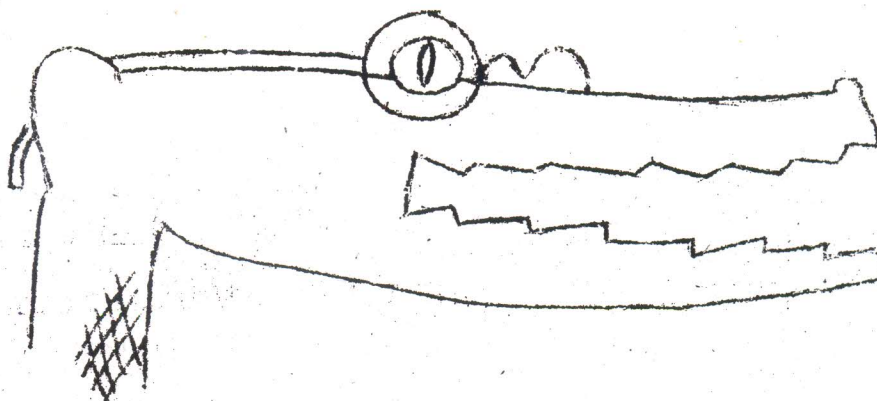
We were told that the moat around Kandy Palace housed large numbers of these turtles even as late as the 1960s. Melanochelys and the flap-shell turtle Lissemys punctata flesh are thought to be good for strength. Eating the flesh is said to make ones muscles so hard that a hypodermic needle will bend when injected.

In the north central province the star tortoises are said to have become such pests in the beans and pea fields that they are routinely collected in the mornings in organised hunts and buried underground to kill them.

Shaker Dattatri.
J. Vijaya
with
Dharmin Samarajiva:

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MUGGER BREEDING IN GOA

Yet another record of mugger breeding was recently communicated to us by Shri R.N. Naik, ACF, Wildlife, Bondla. They have two pairs of mugger in their Mini Zoo. This year on 31st May thirteen young hatched from a nest in the enclosure. There are about 12 different facilities now breeding mugger in India; is it destined to become our first domesticated reptile?

MADRAS CROCODILE BANK TRUST 1983 CAIMAN (*Caiman crocodilus*) NESTING AND HATCHING

<u>Female Clip No.</u>	<u>Eggs</u>	<u>Hatched (%)</u>	<u>days of Incubation</u>
11	41	11 (27)	77
6	23	16 (70)	76
2	29	1 (.03)	83
10	31	6 (19)	75
	<u>124</u>	<u>34 (27)</u>	

This was the second nesting season for these young females which might explain the low hatching rate for three of the nests. Female No.10 laid her eggs on top of No.2's nest and the eggs were put into an artificial nest by the keeper. In the coming season husbandry improvements will include diet modifications, compartments for the females and removal of extra males.

MADRAS CROCODILE BANK TRUST 1983 SALTWATER CROCODILE (*C. porosus*) NESTING AND HATCHING

<u>Female No.</u>	<u>Eggs</u>	<u>Hatched (%)</u>	<u>Days of Incubation</u>
1	42	17 (41)	88

This is the first successful breeding of this species in India. This female made nests with fertile eggs twice before but the nesting media proved unsuitable and in one case the eggs dessicated and in the second they were almost cooked by extreme temperatures. One of the young is of the very pale phase, known to be quite a regular feature of the species.

CROCODILE FOUND DEAD IN DAM
Hindu 30/3/83

A male crocodile, which got stuck in slush when a sluice in the Amaravathy dam near here, was opened recently to clear it of dead fish, was found dead.

The carcass- 4 feet long, 6 1/2 feet in girth and weighing 500 kg- was taken to the Amaravathy crocodile farm in a lorry by the Amaravathynagar forest range officials. They said the skin of the dead crocodile would fetch Rs.1 lakh if it was sold to foreign countries. They were awaiting orders from higher authorities on sale of the skin. The storage in the dam was so low that the fish there died rapidly.

THE RUTHLESS ALLIGATOR POACHERS OF PANTANAL
(from Newsweek, 7/3/83)

For 17 hours the police sweltered in 110 degree heat and waded through waist-deep water. Then they closed in. The seven-man squad had pursued the suspects in the heart of the Brazilian swamps. The criminals were not drug runners defending a cache of cocaine or marijuana. The contraband, in fact, was a good deal more prosaic- though no less profitable: 1,500 alligator hides worth a total of about \$20,000.

Last month's skirmish- in which one police officer was killed in a burst of machinegun fire- was only the latest escalation in what is rapidly becoming an all-out war in Brazil's lush Pantanal region. In the past year an army of 3,000 poachers has swarmed into the swamps, terrorizing villagers and slaughtering more than 2 million alligators. Poaching in the Pantanal has now become big business, luring organized gangs of mercenaries from neighboring Bolivia and Paraguay as well as native Brazilians. "This is a national emergency," fumes Cleone Gomes de Arruda, who works on an estate in the Pantanal town of Aquidauana. "They invade your farm, kill your cattle for meat and come into your kitchen to rob the table salt for curing the hides".

Sleek Cessnas: Brazilian authorities admit that they are losing the war at the moment. The poachers, financed by a handful of smuggling rings based near the border, seem to possess almost unlimited resources and ruthlessness. Bush pilots earn as much as \$1,500 a day ferrying the hot hides in sleek Cessnas, while the poachers themselves- carrying modern assault rifles- have declared open season on police who get in their way.

The alligators are easy prey. Poachers blind their sluggish quarry with flashlights and dispatch them with either a single blow from a club or a spray of gunfire. An energetic team can bag at least 200 alligators in a few hours. And the steadily rising body count is not the only environmental concern; officials worry that the illegal skin trade also threatens to disrupt the

Pantanal's fragile ecology, with its 5,000 species of animal life and rare tropical flora. As Asturio Ferreira dos Santos, head of the committee to defend the Pantanal, says, "The Pantanal will be destroyed in three years if this isn't stopped."

That deadline will be difficult to beat. Appeals to Paraguay and Bolivia to help stem the flow of mercenaries have gone largely unheeded. Wilson Barbosa Martins, the governor-elect of the area, concedes, "They have problems much more pressing than alligator hunters to attend to." There have been calls to send in units of the regular Brazilian Army, but the real solution probably lies in an economic upturn for the depressed region. Until then, as one expert observes, "every unemployed fisherman will be a poacher in the Pantanal".

FOOD OF INDIAN CROCODILES

Abstract: In this paper food and food habits of two species of crocodiles, Crocodylus porosus (Schenider) and Crocodylus palustris (Lesson) have been discussed in relation to the available food of their natural habitat and comparison has been drawn of the food and food habits of these three species of crocodiles in relation to the Crocodylus niloticus. Suggestions have been given with respect to food and feeding of captive hatchlings and adults.

Introduction: Natural food and food habits of Indian crocodiles have not been studied well. In captive condition crocodiles are being fed with food which has been proved by trial and error method sufficient for their growth and maintainance. The food habits and natural foods available for crocodiles in the wild is an important aspect of crocodile ecology. But the three Indian species of crocodiles have become so rare in India that the direct method of examining their gut is impossible. Therefore, instead of killing crocodiles for studying their gut content as had been done in case of the Nile crocodile (Cott, 1960). I discuss an indirect method of studying crocodile feeding habits.

Food and food habits of the gharial, Gavialis gangeticus have not been discussed in this article because due to specialisation of their mouth fish is their chief food. This fish eating habit could become another factor threatening their existence as they may compete with man for the common food.

Observation and discussion: The food habits of captive C. palustris and C. porosus are similar to those reported for wild C. niloticus (Cott, 1960). Observations of feeding habits of hatchlings and adult saltwater crocodiles were made at the Govt. rearing stations of Bhagabatpur in W. Bengal and Dangmal, Orissa and of gharial studied at the Nandankanan Biological Park (Biswas & Acharjyo 1975).

Body length is a key factor in the feeding behaviour and diet of C. niloticus and possibly this is true also for C. palustris and C. porosus. According to Cott the importance of crabs as food of the Nile crocodile varied widely in different waters of Africa. In the stomach contents of this species from four different niches no crabs were found but in one locality in the upper Zambesi, crabs formed a substantial part of the diet of crocodiles upto the size of about 1.5 metres in length. Fish formed the main food of those of 2.0 to 2.5 metres. Crocodiles of 0.5 to 2.5 metres sizes generally take Crustacea, Molluscs, fishes and Amphibia. In the size group of 0.3 to 0.5 metres insects were the main diet.

When the hatchlings first emerge no food supply is necessary for nearly 15 days because during this period a large quantity of yolk within the body supplies the required nutrition till they start hunting. Feeding hatchlings regularly is an important problem in our hatcheries and rearing farms because small prawns and fingerlings may not be possible to procure throughout the season. Also it is a costly diet as small prawns and fishes have good demand in our local markets. The hatchlings of Crocodilus porosus are being reared by feeding them fingerlings and small fishes at Dagmal Crocodile Farm (Forest Dept., Govt. of Orissa and small prawns at Bhagabatpur Crocodile Farm, (Forest Dept. Govt. of West Bengal). The yearlings at Bhagabatpur are being maintained on a diet of mudskippers (Periophthalmus sp.) and crabs that are locally procured by their field collectors.

Young Nile crocodiles of 0.3 to 0.5 metres were observed to capture insects both day and night above the water. During this period they lead a secluded life among waterside vegetation and weed-choked shallows. In the rearing farms hatchlings of C. porosus of .3 to .5m have also been found to spend most of their time outside water in bushes a diet of beetles has also been recorded for them. Therefore it is presumed that hatchlings can be easily and economically reared on an insect diet in our farms.

Coleoptera belonging to the families such as Cicadellidae, Carabidae, Dytiscidae, Hydrophilidae, Scarabaeidae; Hemiptera such as Hydrometridae, Belostomatidae, Naucoridae, Napidae; Hymenoptera such as Formicidae and Orthoptera such as Tettigoniidae, Gryllidae, Acrididae and Gryllotalpidae can be easily collected by the light traps and particularly aquatic insects and their larvae from ponds and stagnant waters. Crocodiles and their hatchlings being mainly crepuscular feeders, I suggest that this method of feeding will be very affective. Hopefully at least one crocodile farm will test the suggested insect food for a group of their hatchlings. It was observed at Nandankanan Biological Park, Orissa that ghorial hatchlings in captivity behave like other crocodile hatchlings in selecting shelter and therefore it is surmised that they may eat insects. Emerged hatchlings take shelter in parts of the river where the current is slow and the shore line is covered with reeds or aquatic vegetation. There

is good habitat for crocodile hatchlings at the Satkosia Gorge Sanctuary on the Mahanadi river where they can get a good supply of aquatic and other insects as well as small fish and prawns.

Mollusca are an especially important item of food for crocodiles between the size of 0.5 to 2.5 meters because these are important sources of bone building. During the ebb tide in the Sunderbans and Bhitarkanika when river banks and canals are exposed, large number of gastropods are found on the banks. A survey of the Sunderbans has revealed the following gastropod molluscs commonly occurring there: Neritina violacea, N. articulata, Littorina scabra, Telescopium telescopium, Cerithiidea obtusa, C. cingulata, Cyma carinifera, Semifusus pusillus, Ellobium gangeticum and Pythia plicata. Our freshwater ponds, marshes and lakes also contain a good number of freshwater molluscs such as Pila globosa, Bellamya bengalensis etc.

Hatchlings of the size group of 0.5 metre and above can be also provided with smaller crabs other than molluscs, tadpoles and Caridean prawns. Some smaller crabs such as Varuna litterata, post larval stages of Scylla serrata and small Penaeid prawns are also suitable for this size group.

For regular feeding of yearlings and above common estuarine crabs such as Scylla serrata, Sesarma bidens, S. impressa, S. taeniolatum, Uca triangularis, Charybdis rostratum and prawns as for example Metapenaeus brevirostris, Parapenaeopsis sculptilis and Hippolysmata ensirostris are available. Freshwater prawns belonging to the genera Leptocarpus, Palaemon, Macrobrachium and Potamonid crabs, Paratelphusa and Potamon can be fed to both the saltwater crocodile as well as the mugger. Yearlings may be fed fishes in addition to Amphibia, Mollusca and crabs. The mud-skipper is a natural food of yearlings of the saltwater crocodile. Periophthalmus pearsei, P. kolereuteri and Boleophthalmus boddarti are abundant on the muddy banks between tidal marks in the channels and creeks of the Sunderbans and Bhitarkanika saltwater crocodile sanctuary.

Acknowledgements:

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Editor's Note: At the Madras Crocodile Bank young crocodiles and caiman are fed mole crabs (Albunea sp.) for about of their total diet. For the first year hatchlings are housed in pens with lights over the ponds. Lakhs of insects are attracted on evenings during the July, August showers, just the right time to give this vital boost to the now 2-3 month old hatchlings. We have often watched the hatchlings gorging themselves till their stomachs were tightly stretched on winged termites moths and water beetles. We consider this seasonal abundance a supplement to the main MCBT hatchling diet of chopped whole fish, fingerlings, tadpoles, small frogs and chopped mole crabs
RW & ZW

BREEDING MUGGER AT MADRAS CROCODILE BANK TRUST

Only three females double nested this year at MCBT. Overall hatching rate was 71% and the survival rate so far (three months post-hatching) is over 99% (one death).

MCBT 1983 MUGGER (Crocodylus palustris) NESTING AND HATCHING

<u>PIT NO. 8</u>			
<u>Name</u>	<u>Eggs</u>	<u>Hatched(%)</u>	<u>Days of Incubation</u>
Chitra	35	28(80)	78
Metty	42	12(29)	79
Karuppukunn	31	26(84)	75
Blackie	42	31(74)	71
Stumpy	30	28(93)	76
Vijaya	29	26(90)	68
Misty	29	26(90)	78
Nova	28	27(96)	74
Metty (2nd nest)	9	3(33)	69
Chitra (2nd nest)	28	22(79)	71
Karuppukunn (2nd nest)	27	11(41) _m	70
	<u>330</u>	<u>240(73)</u>	

(Pit No.10)

<u>Name</u>	<u>Eggs</u>	<u>Hatched(%)</u>	<u>Days of Incubation</u>
464 code No.	23	12(52)	71

SUMMARY OF 1983 RESULTS

No. of nests : 12
No. of eggs: 330
No. hatched: 252
No. eggs per nest : range: 9-42, average : 27.5
Days of incubation : range : 68-79, average: 73
Hatching percentage : 71%

MSPT MUGGER BREEDING RESULTS

- 1.
- 2.

It might be recalled that Rani's 1982 single nest failed. We attributed this to possible "inhibition response" as a result of the presence of nine of Rani's 19 offspring in the same pen. This year we separated these nine into an adjacent pen and Rani reverted back to successful, double nesting. Controlled studies to pursue this question would be desirable.

AMARAVATHI CROCODILE FARM

Started in 1975 by the Tamil Nadu Forest Department this farm at present has around 600 marsh crocodiles, sorted and reared in concrete ponds, under the care of Mr. M. Rajan. This pilot project is one of several marsh crocodile rearing centres in the state of Tamil Nadu. Initially and even now, crocodile eggs are collected from the wild mainly from the Dhuvanam area of Amaravathi Reservoir, hatched and reared at the project site. At present there are 15 nests known from the wild*, two of which were this year protected in situ the rest transferred to the hatchery. The farm has a breeding stock of 8 adults; this year 5 nests were laid (females of 1975/76 stock). The nests in the hatchery are exposed to intense heat which may be the main reason as to why the hatching percentage has been low (20-30%). The Chief source of water is a percolation well. The concrete ponds are not deep enough, but are being altered. It is also being proposed to move the adults to larger, more natural pens.

* It is interesting to note that when MSPT started the crocodile egg collection programme at Amaravathi in 1975 we found 14 nests, reflecting very little change in the structure of the breeding population there in the past eight years (Ed.)

CROCODILE MORTALITY AT AMARAVATHI FARM

There has been fairly high mortality among the hatchling and yearling sizes of mugger at the Amaravathi crocodile farm and rearing station.

1. Numerous cysts appear at the floor of the buccal cavity resulting in ulcerous growths, later becoming reddish in colour.
2. The buccal cavity loses colour and the animals stop feeding.
3. At a more advanced phase the eye balls swell abnormally and the nictitating membrane involuntarily covers the eyes while pus exudes from the conjunctiva, resulting in total blindness.
4. In the final stages, it moves about in circles totally disoriented with mouth open and soon dies.

The problem is little understood, but meanwhile, affected specimens have been segregated from the rest of the stock. Treatment with antibiotics by Forest Dept. veterinary veteran, Dr. V. Krishnamurthy, together with vitamin additives to food plus scrupulous disinfectant cleaning of the ponds seems to have helped greatly.

AMARAVATHI RESERVOIR

The Amaravathi dam mainly serves as an irrigation source for agricultural lands in Periyar and Coimbatore districts. The water level in May was extremely low and at least 10 tons of fish were lost. Reportedly it will take at least 2 years for the reservoir to recuperate and for the fishery to rehabilitate itself if it suffers no further setback. Reliable estimates of crocodiles of all sizes in the wild here are about 50 animals.

CROCODILES AT MOYAR

There has always been a fairly stable population of mugger in the Moyar river even when they were on the verge of extinction in other places. This survey was made 10 km's downriver from where the Sigur river meets the Moyar.

These crocodiles occupy a definite niche, specifically the larger pools which are perennial, including pools like Palthatti, Mosala Madavu (mosala is the local word for crocodile), Billinecu Kaddavu, Thirugina Madavu. These pools are occupied by solitary animals, pairs or up to 3 or 4 crocodiles. On our previous visit in January 1983, we saw a pair basking on a large rock in the middy sun.

These animals are extremely shy and hard to approach. Attacks on humans are very rare and the local Irulas are quite used to them, allowing their children to splash merrily in the stream. The Irulas do know about the protective behaviour of nesting females however.



DIG-HEADED
SOFTSHELL



4-LEG ANT

BORNEO CROCODILE SURVEY

As reported in the last newsletter the Director Rom Whitaker spent two months surveying crocodiles in the Malaysian state of Sabah in north east Borneo. This was a WWF project initiated by the Game Branch, Sabah Forest Department, Sandakan*. The following extracts from his field notes describe some of his herpetological and other encounters.

*The survey included all the major river systems of the east coast: the Sugut/Paitan, Kinabatangan and Segma. The Padas and Klias rivers on Klias Peninsula were also covered.

20.4.83, 8 AM, Labuk River.

We just got unstuck from a sandbank- the tide is very low and the smoke from the burning logged areas is so thick we can't really see where we are going: the sun barely penetrates. The smoke apparently covers the entire island of Borneo and was thick on the mainland as well. Most areas have had no rain since December and this is the longest drought in living memory. Patches of rain forest on fire! Our boat serang is a very cautious bloke and its unlikely that we will make it to the Sugut River today as planned. The timber business is booming: the Japs are the big buyers: money keeps pouring in and forests keep coming down. Saw some real stands of Bornean jungle at Sepilok- the orangutan rehabilitation centre where we stopped on the way to the boat.

21.4.83, 7 AM, Sugut River.

at We are anchored/a junction of a large tributary about 30 kms in from the sea. There are timber camps and river traffic but intact jungle all around. Last night we did four hours of survey in the jongkong (dingy) and saw 5 crocs, all salties and 2 of them yearlings (one of which I caught and have now to photograph)- very long and lean proportionately, snout especially narrow. We saw lots of animal life along the river in the night, civets, and proboscis monkeys fairly common. At one point the motor stopped and when the boatman pulled on the cord the trees came alive with deep growls and alarm screams from a big troop.

Day before yesterday we found a very pretty Elaphe dead on the road near Sandakan. On the way to the Sugut kind of mess of the ocean (that old familiar light stomachy feeling, we hooked two big Spanish mackerel, part of which was prepared for dinner, fried with masala, the rest boiled into a soup, plus the eternal rice. Yesterday while we were waiting for the smoke to clear we went fishing in

a small creek and saw 3 water monitors in about ten minutes. They let us get within 10-15 metres, refreshing after the acute paranoia of the south Indian monitors.

Early this morning was a bit of nightmare, woke to the noise of the serang and his mate puking their guts out. Seems like food poisoning but the rest of us don't have it. We picked them off in the dinghy downriver to a big timber camp where they can either get help or get sent on toward the Labuk where there is an aid station.

6 PM

We'll soon eat some dinner and leave for the nightly surveys. Macaques and proboscis monkeys make a racket in the forest just downriver, birds silent except for a few die hard sunbirds and an occasional unidentified Squark. We have a new serang now, a jolly talkative fellow with his pressed uniform offset by a wide garishly painted straw hat. No smoke in the air up here, and a strong breeze across the Sulu Sea from the Philippines. Flock of green pigeons just flew by. There are a few remnant rhino still around and wild cattle- banteng- but little chance of seeing any. Sambar, barking deer and mouse deer common, occasional ^{clouded} leopards, many tree shrews, a wild pig and the very strange little primate, the tarsier. Also a white, stinky rodent called the moon rat, plus a number of small to medium squirrels, 2 macaques, 1 langur and the proboscis fellow. A bit disappointing from the reptile standpoint-- lack of snakes and lizards bad for the soul. But it's very dry for rain forest.

The tide has just changed and the leaves and seeds and other flotsam is now headed back down toward the sea. Some stuff must go back and forth endlessly with the tide. On a happier note, we have a portable generator on board and it's nice to be able to read in the evenings. And there's always a big pot of sweet coffee on and everyone drinks innumerable cups.

22.4.83

Last night we hunted the first two of seven ox-bow lakes, dead arms of the river- peaceful, still, eerie places, but only one croc. Jokin and his son meanwhile went upriver and returned with a big fish, a baby croc and an interesting frog. So far we've been returning to the launch each night but today we were on our way upriver to do some camping and visit some ox-bows cut off from the river by 4-5 miles of jungle when the jongkong's motor cut out. So here we are parked in front of a little downriver village trying to negotiate a motor on loan.

26.4.83, enroute Sugut River to Paitan River (open sea)

Its morning- we spent the night in the Sugut River mouth and when the tide was up, headed out to sea and north toward paitan, about a four hour run. We stopped at one of the three islands, Pulo Tiga, where a turtle with a red head is reported to nest in this season. So far we had no other clue as to where Callagur borneensis nests. Unfortunately we found nothing but several green and hawksbill nests and more unfortunately they contained spoiled nearly full term embryos, a result no doubt of

someone having set all the bushes on fire some weeks ago. This means that greens and hawksbills are nesting in February. Shrimp trawler people anchored off the island pointed to another of the islands and said that was where several species nested- but the serang wants to ride the tide up into the Paitan so we are on our way again.

The last five days on the Sugut have been fantastic. We only saw a total of 20 crocs, all salties, but the mystery of Tomistoma and possibly another freshwater croc still remains after our visit to an isolated oxbow lake, Sabahpola, deep in the forest. We walked for 2½ hours, the first part of it through the kind of secondary forest that is really a pain; plenty of spiky rattan tendrils catching you as you duck through dark tunnels of vegetation and vines to trip you up. We were roughly following the course of a meandering stream, now almost dry now. One of us found a long shedded skin, nearly 3 metres. King cobra! I immediately say because of the size, but a closer look makes it a rat snake- Ptyas korros which is supposed to reach nearly 4 metres.

An hour more of tramping in the still heat under the canopy of tall trees and we come to the beginning of a big swamp, no doubt the remains of the ancient bed of the Sugut River, not about 5 kms away. The great variety of jungle trees gives way to a strange world of tangled Ficus. We came to the first few remnant pools, thick sludgy mud holes surrounded by reed beds; from one of these a wild pig jumped up hysterically and takes off snorting, tail twisting like a pinwheel. Jan, son of our croc hunter/guide Jokin takes off ahead of us at a full tilt run- "Biawak", says Jokin as we join the chase; monitor lizard. It finally holes up in the hollow of a living tree and Jan goes to work cutting a hole with his parang. Five minutes of chopping and we see the monitor's tail and hind legs and, as no one is too keen on monitors I grab what's in view and haul him out. Water monitor but different from our salvator, with few markings except some of the distinctive yellow patches on the tail. He's about 5ft long (1½m) and we take some pictures before letting him slide into the pool.

Its still a long way to our oxbow lake but the urge to do some fishing is too strong so out come the hooks and line. The sludge pool is packed, being the last remaining water and as soon as the bait hit the surface two or three murrel would attack it. Jan, true to form, climbed up on a big ficus branch over the water and started throwing fish ashore. Suddenly he stopped and staring at a clump of epiphytes next to him, said the magic word "ular"- snake. I grabbed a bag and joined him on his branch. A beautiful baby reticulated python was coiled in the epiphytes. In a stupid attempt to lessen the trauma of capture for the snake, I lost him: instead of making a grab I held the bag below it, prodded it on the other side and zip! down he went past the bag and straight into the water like an arrow. So we just collected our fish and trudged on through the swamp.

We arrived at the north end of the oxbow and found a log raft left by a fishing camp. We were grateful because walking around oxbows can be pure hell thanks to the thin spiky pandanus. As we pushed the raft off some submerged branches a loud splashing and crashin made us jump and there was a big croc launching itself from the weed choked shallows into the dark water. Its a shame none of us got a clear view of it, especially as Jokin says that a croc he once killed here was darker and definitely different than a saltie-- not Tomistoma either, he's never seen or heard of one. Jan and I poled across to the other end of the lake and as we neared the shore there was another commotion as a big croc fought its way through the shallows and dove under the raft which suddenly seemed very fragile. A sudden plop and we had a quick glimpse of another croc, a baby, as it slid into the water from a fallen tree. Still no good look at the beasts. This oxbow was the most remote from the river that we had visited and the best possibility for anything but a salty to be in. Later that day we saw the track of a crocodile that had recently walked overland via the swamp from one of the drying pools to this oxbow, a typical, 'freshie' habit but of course a salty would do it if the obvious necessity of drought forced it to. We were unprepared to stay the night so Sabahpola still holds the mystery of which croc is resident there. The final cap to that day was a stop on a sandy beach at a bend in the river for a long cool soak, watching it get dark with the huge fruit bats soaring down for a splashy drink in the river and hearing the daytime sounds give way to the noises of the night.

The day had begun when we stopped on our way upriver to see some fishermen operating their traps. We went over to the launch which buys up their shrimp to take to Sandakan and they had 2 turtles, a Pelochelys bibroni and one that might have been a Trionyx cartilagineus, big fellow about 30 kg in weight. The big Trionyx which are caught both in the river as well as in the oxbows on baited hooks have similar (but less) white callosities on the folds of the neck as do the temple tank turtles in India and Bangladesh. By the way we found a Dogania crossing the road about 25 km from Sandakan. This is the end of our Sugut-Paitan trip as there is apparently a cholera epidemic on and vast areas have been blocked off in an effort to contain it. We're being extra careful about drinking water etc. but have had several imaginary 'symptoms' of course. So back to Sandakan to prepare for the Kinabatangan odyssey.

9.5.83, Kinabatangan River

We've had five days on the Kinabatangan, locating oxbow lakes off the main river by day and surveying them at night. Disappointing so far for crocs. One problem is that most of the oxbows are unconnected to the main river and getting around them at night is impossible through the thick boundaries of a thin leafed pandanus. To this end John Payne has provided four inner tubes with which to rig a raft that can be carried overland to the oxbows.

On the 5th evening we headed upriver from Bukit Gram (hill of salt) as far as we could go before dark, hitting several logs but luckily no disasters. No villages but a couple of timber camps; saw hundreds of crab eating macaques- the most common monkey in Sabah- and a couple of proboscis troops. 6 wild boar watched us pass, fairly unconcerned. Around a bend we suddenly came up to 4 elephants- 2 cows and 2 calves- wading in mid-river. We drew up to within 100 m and they started moving away to the other side. The best oxbow we've seen so far was hidden deep in the forest and surrounded by heavy swamp vegetation studded with elephant and banteng tracks. It was hard to approach through the thick pandanus but worth it once there, having jumped from one pandanus hammock to another. And there on top of one hammock was a Malayan box turtle taking the air no doubt. In the foreground, numerous dark round heads bobbed up into view and then dove like miniature dolphins- otters- diving and fishing and chirping loudly at each other as they moved across the lake. We waited till nightfall then another four hour river survey, spotlighting till our eyes started to burn: results- 4 crocs seen and several small boats out fishing and croc hunting. This explains why the crocs are so shy and difficult to approach. Made camp on the only pebbly beach we could find. Damp beds, heavy dew and clouds of mosquitos.

Headed downriver next morning toward the group of 3 oxbows we wanted to survey (the oxbows are the best croc habitat now with all the disturbance on the main rivers). Visited the first by day and found that a channel from the river could take our boat all the way in, once the tide was high; a bit of shoving and tugging past logs and thick stands of grass in a few places. Caught a beautiful green anglo-head lizard (Goniocephalus) and the oxbows looked good for crocs- but being so accessible I was prepared to be disappointed. Sure enough when we surveyed between 7 and 10 PM we didn't see any crocs. We walked five minutes through the forest to the second oxbow and found a rickety, rot-bottom dugout that we gingerly set out in, listening to owl and fish splashing sounds break the absolute silence of the lake. No moon but starlight quite considerable. As I shone the light over the water and along the banks hoping for a croc eye I picked up several mammals, civets, otters and others. And in fact on our return there were six otters playing along the shore, allowing us to get right up next to them as they watched the light and squeaked their questioning calls to each other, heads bobbing and as unable to keep still as any mongoose we've known. The fish in the shallows were dramatically affected by the light and would leap in bunches, several landing right in the boat. But no crocodiles in view; possibly some hidden in the thick bed at either end of the lake. On the way back to where we would leave the canoe I suddenly saw a large, brightly coloured snake swimming out from shore- big Boiga called the mangrove snake- grabbed it by the tail and flipped it into the boat, hissing and open mouthed (ie the snake). In the general excitement we almost dived into the water ourselves.

Didn't have a bag with me and the snake kept coming up on bare feet so I yelled to Sampalodon to get us to shore. His efforts at speed made the canoe roll precariously, we must have been a hilarious sight before we finally made it to shore to mickey mouse a snake bag. It was nearly six feet long, glossy black with thin bright yellow bands. After a picture session this morning we released it and watched as he grace- and grate-fully climbed way up into the trees.

Last night we also caught a mock viper, Psammodynastes pictus- a beautiful small greenish snake with chocolate brown markings on the back. And just to cap a very full day the bright reflecting eyes of a tarsier showed up next to where we were sleeping.

R.W.

Pom acknowledges with thanks the support of this survey by WWF Malaysia and the Game Branch, Sanlekan.

FOR FARMERS. THE YEAR OF THE RAT (PLAGUE)

From, Asiaweek, April 15, 1983

Three hundred adobe huts collapsed recently during a rainstorm at a Shandong Province commune. All were riddled with rat holes.

Last year, rats and voles ravaged an area of Chinese pastureland equal to half the size of Burma. Losses included some 140m tons of hay, worth \$400m.

In China's northeastern provinces, 2,000 sq. kms. of choice forests are infested with rodents. In the worst-hit areas, 30% of the trees have died.

Ecologists and zoologists agree that 1983 could well be China's year of the rat. The main victims of this plague of vermin are the peasants. A survey of eighteen provinces last year showed that 20m. ha. of cropland was infested by rodents, up from 6.6m. ha. in 1981. Experts estimate that in some regions, as many as 100 rats inhabit one mu (one-fifteenth of a hectare) of farmland, and that 5% to 10% of grain and other farm produce have become their feed. Thus, of the 37b. catties of crop harvested in Anhui Province last year, 2b. was devoured by rats. The loss was comparable to that inflicted by an unprecedented spate of floods last year.

For centuries, China has played reluctant host to gargantuan rodent populations. An estimated 180,000 people died in plagues from 1900 to 1949. Ever since then, rats have been responsible for transmitting measles, typhoid fever and leptospirosis. Why the recent resurgence? Says Wang Dengsan, a researcher at the Chinese Institute of Environmental Sciences: "Because of the widespread use of rat poison, enemies of rats such as cats, yellow weasels, foxes eagles, owls and snakes are also exterminated. This is exacerbated by indiscriminate hunting of the previous species. Deforestation is the third cause".

Commune members nowadays are encouraged to branch out into all areas of farming and hunting, and many are eager to supplement their income by snaring wild animals. At the height of the Spring reproduction season for snakes last year, authorities in Jiangjin Country, Sichuan, offered bounties for 200,000 vegetable-flower snakes and pine-flower snakes. In no time, the reptiles, eagerly sought after by gourmets and herbal doctors alike, were hounded to extinction. But the rats multiplied and consumed all the maize seeds planted by the farmers that season.

Farmed environmental scientist Hou Xueyu thinks that the ecological balance in China has been upset. According to Hou, a pair of rodent produce 50 to 100 offspring a year, while their enemies breed much more slowly. On the other hand, if the natural foes of rats could be brought from the brink of extirpation, they

could do wonders. An owl eats up to five rats or voles a night. And this could mean savings of 2,000 catties of grain for a farmer in a year. Snakes and weasels are even more efficacious. A few weasels can protect 70-odd mu of crops.

Experts agreed that, just as it was pecuniary inducements which first encouraged farmers to decimate snakes and weasels, monetary rewards will also help in the anti-rodent campaign.

NEW BOOKS!

Announcing the inventory of live reptiles and amphibians in captivity - current January 1, 1983 by Frank L. Slavens. This totally new revised edition contains an inventory of living specimens held in 198 reptile and amphibian collections (75 public and 123 private) from ten countries. Information is current as of January 1, 1983 with 366 genera, 911 species and 1,191 forms represented. The information on reproduction includes 367 taxa along with a 40 page bibliography on breeding.

Published by the author, P.O. Box 30744, Seattle, Washington, 98103, 1983. 254 pp. \$25.00 (\$20.00 paper) plus postage (\$2.50). Available directly from the Author.

A few copies of the 1981 and 1982 editions are also available, same prices as above.

The Society for the Study of Amphibians and Reptiles has announced the publication of *Turtles of Venezuela* by Peter C.H. Pritchard and Pedro Trebbau. It covers all turtles known from Venezuela including the mata mata and other side-necks (11 species), tortoises, pond and land turtles (6 species) and the sea turtles (5 species), together comprising fully half of the turtle species described from the South American continent.

The book is beautifully illustrated. There are 48 fullpage plates in color, 26 of which are original watercolors and the remainder a collection of 160 photographs of both turtles and their habitats.

Orders may be placed with Dr. Douglas Taylor, Department of Zoology, Miami University, Oxford, Ohio 45056, USA.

ERRATA FOR VOL.8 No.2 (MAY 1983)

- P.6 Paragraphs 2,3 C.lepidus klauberi, Huachuca, Dr. Bledsoe
- P.8 PYTHON EATS FOX
- P.9 Paragraph 2 Burchfield, Gladys Porter Zoo, Brownsville Texas.
- P.20 "On a visit to Assam several year ago", Breeden
- P.22 "about ten species locally" (of rodents)
- P.24 "Appendix II of CITES"

IUCN/SSC SNAKE GROUP

Newsletter
No. 5



September 1983

This chairman has always believed that an IUCN Group head should quit when he can no longer cope with the time and effort it takes to "be effective". For various very ordinary reasons I am compelled to give up this post, at least for now. The second Chairman of the SSG will be notified to you in the near future, meanwhile please keep writing to me.

India:

The SSG has submitted a list of rare, endemic and little known Indian snakes to Dr. T.N. Khoshoo, Secretary, Department of Environment (Govt. of India) and recommended protection, surveys and designation of protected areas for species under pressure through habitat loss, hill species in particular. There are 12 snakes endemic to the Andaman and Nicobar Islands and 91 endemic to the Indian mainland, many of which are known from a single locality and/or a few specimens. While this does not necessarily signify rarity, these species are obviously the first candidates for survey effort and money.

At present the following are the snakes protected under the Indian Wildlife (Protection) Act, 1972 Schedules and on the CITES Appendices:

	<u>Schedule</u>	<u>Appendix</u>
1. Python (<u>Python molurus</u>)	I*	I
2. Indian egg-eater (<u>Elachistodon westermanni</u>)	I	II
3. Sand boas (<u>Eryx ssp.</u>)	IV**	II
4. All other Indian snakes	IV	--

- * Schedule I - no capture, killing or trade; collection for scientific purposes under state license.
- ** Schedule IV - capture or killing for consumption or trade permitted under various state licenses.
-

World:

In the February 1983 Endangered Species Bulletin (U.S. Fish and Wildlife Service) the Service proposes Endangered and Threatened status for two species of snakes;

- a. Aruba Island rattlesnake (Crotalus unicolor)
Threatened
- b. Lar Valley viper (Vipera latifii) - Endangered

The bulletin says that the planned construction of a dam in Iran will eliminate the habitat of the Lar Valley viper

In January, 1983 Gren Lucas, Chairman of the Species Survival Commission sent out a circular to the Group Chairman to develop priority lists of all actions necessary to accomplish Group objectives.

Input from SSG Members and Correspondents has provided a beginning for what will become a list of priority projects for which funding and staff must be found. A summary of the responses recently received is given in Table 1.
(see page 36)

The following letter was received in response to a query by the Fauna Preservation Society on the disposal of confiscated snake skin goods by the Bharat Leather Corporation.

Mr. John A Burton
Executive Secretary
Fauna and Flora Preservation Society
c/o Zoological Society of London
Regent's Park, London NW1 4RY

20th April, 1983

Dear Sir,

Please refer to your letter dt. 6th April, 1983 to the Assistant Director, Wildlife Regional Office at Madras regarding sale of confiscated snake and lizard skins.

2. In this connection, I am desired to clarify the position to you that the confiscated skins of reptiles were not in the raw form but were tanned skins stocks of which were freeze subsequent on the imposition of ban on their export. The present exercise of permitting the export of these declared skins through a government agency has been initiated with a view to finally liquidate these stocks with the private dealers so that any incentive for illegal trade involving these stocks is eliminated

(36)

Yours faithfully,

sd/-

(Kishore Rao)

Deputy Director (Wildlife)

TABLE - I SUMMARY OF PROJECT PROPOSALS FOR SNAKE CONSERVATION

Priority Ranking	Descriptive Title of Project	Geographic Location	Estimated Costs(US\$)	Duration	Remarks
					Proposed by:
3	Exploration and conservation of the threatened snakes of N.W. India	N.W. India	1,500	3 Years	Dr. B.D. Sharma P.O. Box 78 Jammu - 180 001 India
2-3	Status, distribution and ecology of the burrowing snakes of the hills of South India	South India	30,000	3 Years	T.S.N. Murthy Zoologist Zoological Survey of India Madras.
2	Ecology and status of the king cobra <u>Ophiophagus hannah</u>	India	15,000	2 Years	Shekar Dattatri Madras Snake Park Trust Madras-600 022
2	Movement patterns and ecological requirements of the San Francisco garter snake, <u>Thamnophis sirtalis tetrataenia</u> .	California, U.S.A.	30,000	2-3 Years	Dr.C. Kenneth Dodd, Jr.
4	Survey of status and distribution of Kirtlands snake, <u>Clonophis kirtlandi</u>	Mid western U.S.A.	25,000	3 Years	
4	Survey of status and distribution of copperbelly water snake <u>Nerodia erthrogaster neglecta</u>	Midwestern U.S.A.	25,000	3 Years	

Priority Ranking	Descriptive Title of Project	Geographic location	Estimated Costs(US\$)	Timing & Duration	Remarks
2	Habitats, threats to, and distribution of the short tailed snake, <u>Stilosoma extenuatum</u>	Florida, U.S.A.	20,000	2 Years	
1	Survey of habitats in the Florida keys for <u>Diadophis punctatus aeneus</u> (key ringneck snake)	Florida, U.S.A.	15,000	2 Years	
1	Survey of the distribution and status of the Atlantic salt marsh snake <u>Nerodia fasciata taeniata</u>	Florida, U.S.A.	25,000	2-3 Years	
1	Distribution and management of the virgin Islands tree boa, <u>Epicrates monensis granti</u>	U.S. and Br. Virgin Islands, West Indies.	15,000	2 Years	
3	Critical habitat for the Virgin Islands tree boa.	U.S. Virgin Islands	- - - -	N/A	
3	Management of the Mona boa. <u>Epicrates m. monensis</u>	Puerto Rico	15,000	2 Years	All the above proposals were submitted by Dr. Kenneth Dodd, Jr. Staff Herpetologist, Office of Endangered species United States Dept. of Interior Washington D.C.20240.

Priority Ranking	Descriptive Title of Project	Geographic Location	Estimated Costs(US\$)	Period of Operation	Remarks
1-2?	Societas Europaea Herpetologica programme to identify critical Habitat sites for threatened European Amphibians & Reptiles.	Council of Europe area.	15,000	3 Years	Dr. Brian Groombridge Compiler, Reptilia & amphibia volumes of Red Data Book.
1-2?	Conservation of <u>Vipera ursinii</u> <u>rabosiensis</u> In eastern Europe	Hungary, Romania (Outside council of Europe)	7,500		Dr. Brian Groombridge
2-3	Survey of <u>Ogmodon vittatus</u> in Fiji	Fiji	---	---	Mr. Fergus clunie, Fiji Museum.
	Survey of the status of the Black pine snake (<u>Pitnophis melanoleucus</u> <u>lodingi</u>) and the Indigo snake. (<u>Drymarchon corais</u>)	Mississippi, U.S.A.	---	---	Prof. Jerome A. Jackson Dept. of Biol. Sci. Mississippi State University.
1	Status and ecological assessment of the <u>Oenpelli python</u> (<u>Python oenpelliensis</u>)	Darwin	60,000	3 Years	Graeme F. Gow, Hon. Curator of Reptiles, Northern Territory Museum of Arts & Sciences, Darwin.
2	Survey of populations of Ne and Central the eastern massasauga <u>Sistrurus catenatus</u>	USA		1-2 Years	Richard A. Seigel, Univ. of Kansas, Lawrence, KS 66045.

SSAR GRANTS-IN-HERPETOLOGY

The Society for the Study of Amphibians and Reptiles is pleased to announce that proposals are now being accepted for the 1984 Grants-In-Herpetology Program. This Program is designed to provide financial support to deserving individuals or organizations engaged in research on or conservation of amphibians and reptiles. All applicants (or their advisor or sponsor) must be a member of SSAR. Grant proposals will be considered in the following areas:

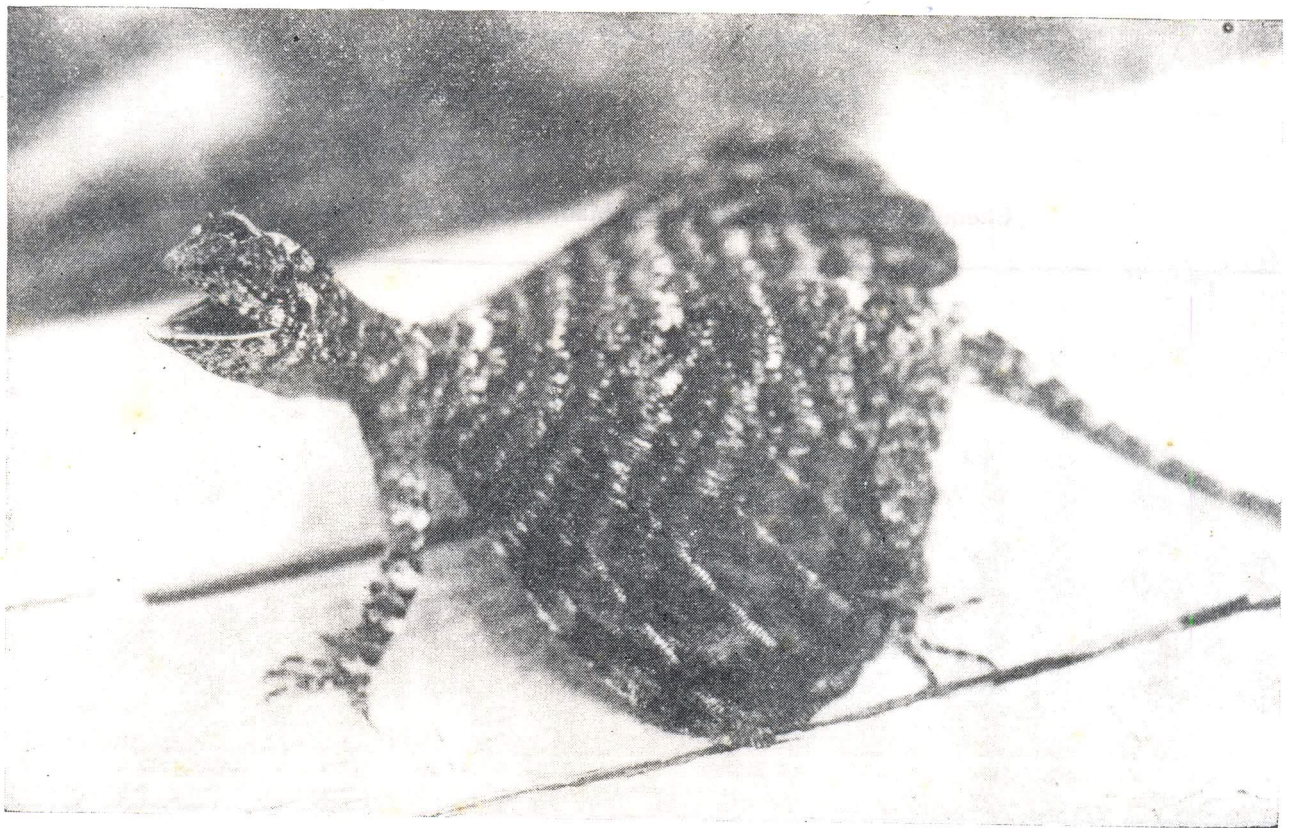
1. GRADUATE STUDENT HERPETOLOGICAL RESEARCH
2. HERPETOLOGY-ORIENTED CONSERVATION.
3. REGIONAL HERPETOLOGICAL SOCIETY PROGRAMS OR PROJECTS.
4. HERPETOLOGICAL RESEARCH IN ZOOS.
5. FIELD WORK (Auto Mileage). (2 awards of \$215.)

Each proposal should include the following information:

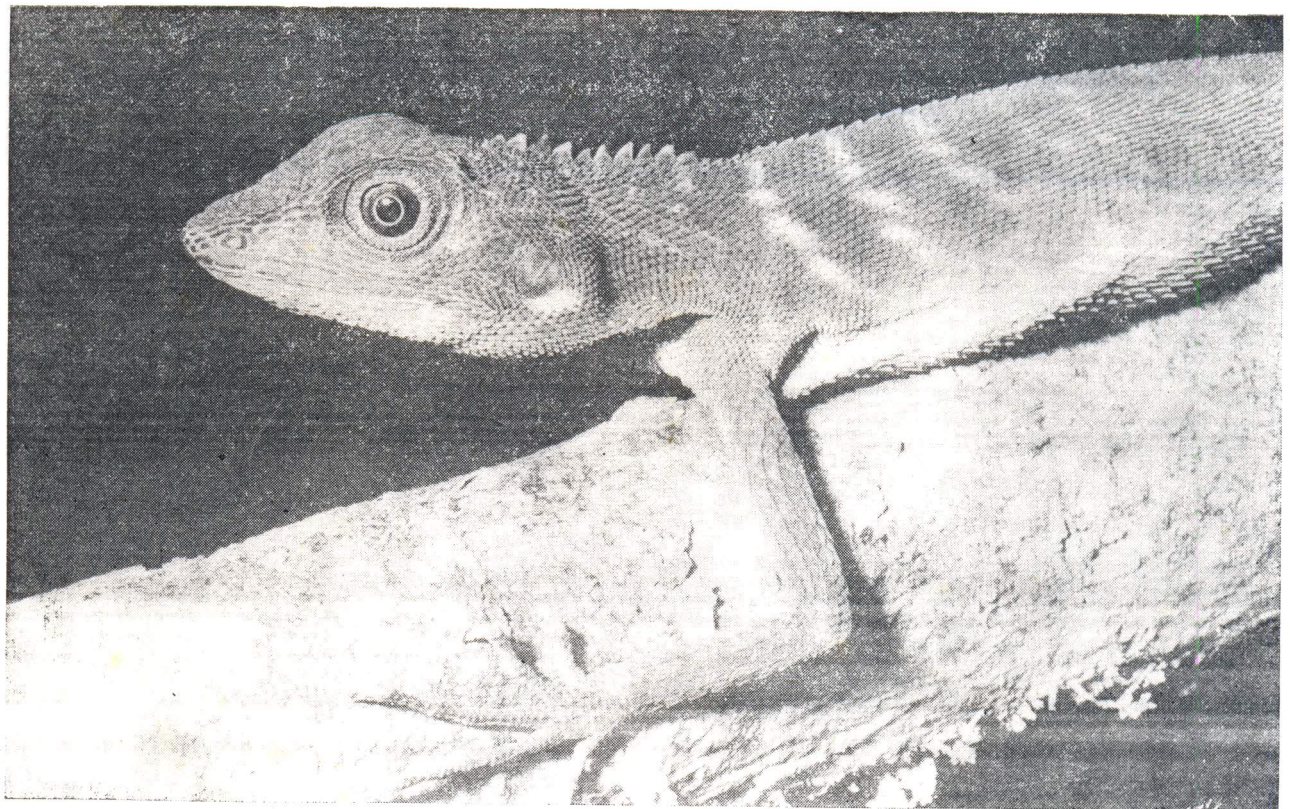
A) Background & Objectives of the proposed project, in terms of its relevance to herpetology, B) Methods of carrying out the research or conducting the project, C) Budget for the project, which should not exceed \$430 in each category, and D) Curriculum Vitae and Letter of Support (if applicable). The proposal must be typed double spaced and must not exceed 5 pages, excluding cover page, abstract, budget, curriculum vitae, and bibliography. All proposals are due no later than 13 April, 1984.

For additional information on proposals see the December 1983 issue of Herp Review or write:

Dr. Linda Maxson
Department of Genetics
and Development
University of Illinois
515 Morrill Hall
505 S. Goodwin Avenue
Urbana, IL 61801



A flying lizard (Draco volans group) demonstrating a unique defensive display.



A green forest agamid in Sabah (Bronchocoela cristatellus)

SUBSCRIPTION

Local : Rs. 10 annually
Foreign : \$ 2 annually (surface)
\$ 4 annually (air-mail)

Cheques should be made to the Madras Snake Park Trust

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Romulus Whitaker (Director)
A. N. Jagannatha Rao
(Hon. Secretary)
M. Krishnan
S. Meenakshisundaram
(Chairman)

Wildlife Warden, Madras.
Deputy Director, Tourism Dept.
Asst. Director (Wildlife) Madras
Dr. M. V. Rajendran
E. R. C. Davidar

Photos by Romulus Whitaker

*Newsletter of the Madras Snake Park Trust, Guindy Deer Park, Madras-600 022. Edited by Zai Whitaker.
Information may be used elsewhere with acknowledgement to Hamadryad, Madras Snake Park Trust.*